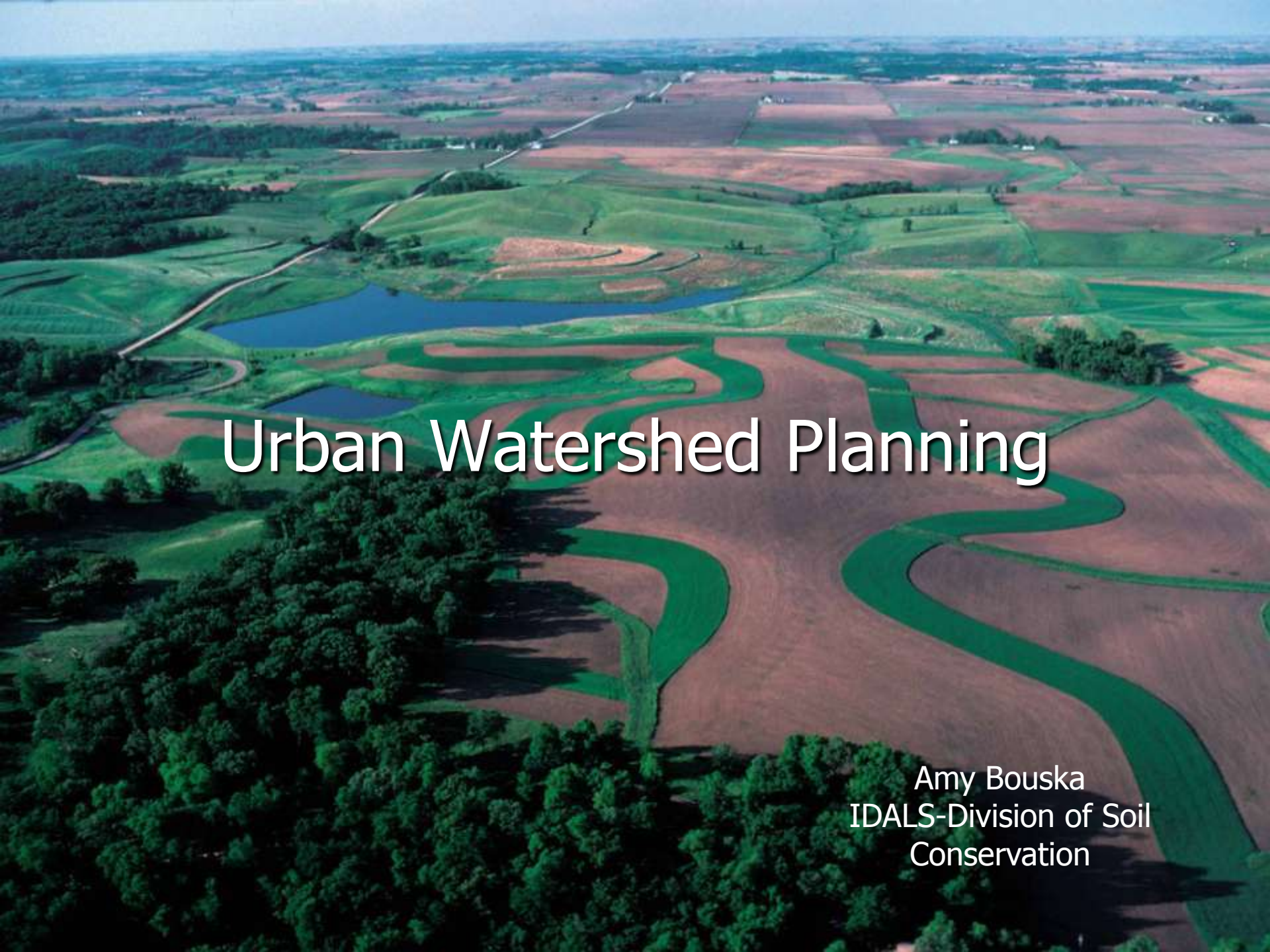
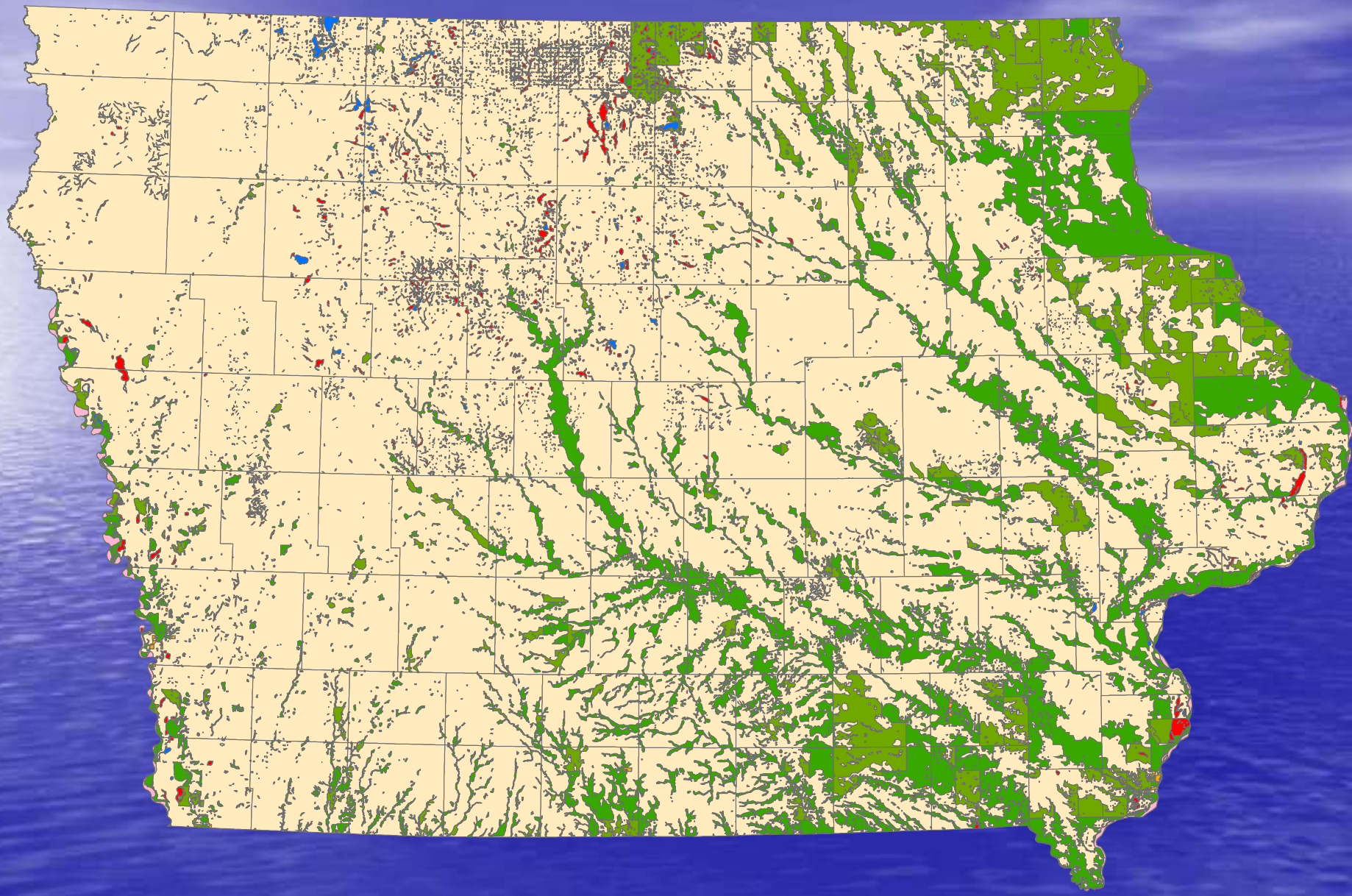


Urban Watershed Planning

Amy Bouska
IDALS-Division of Soil Conservation

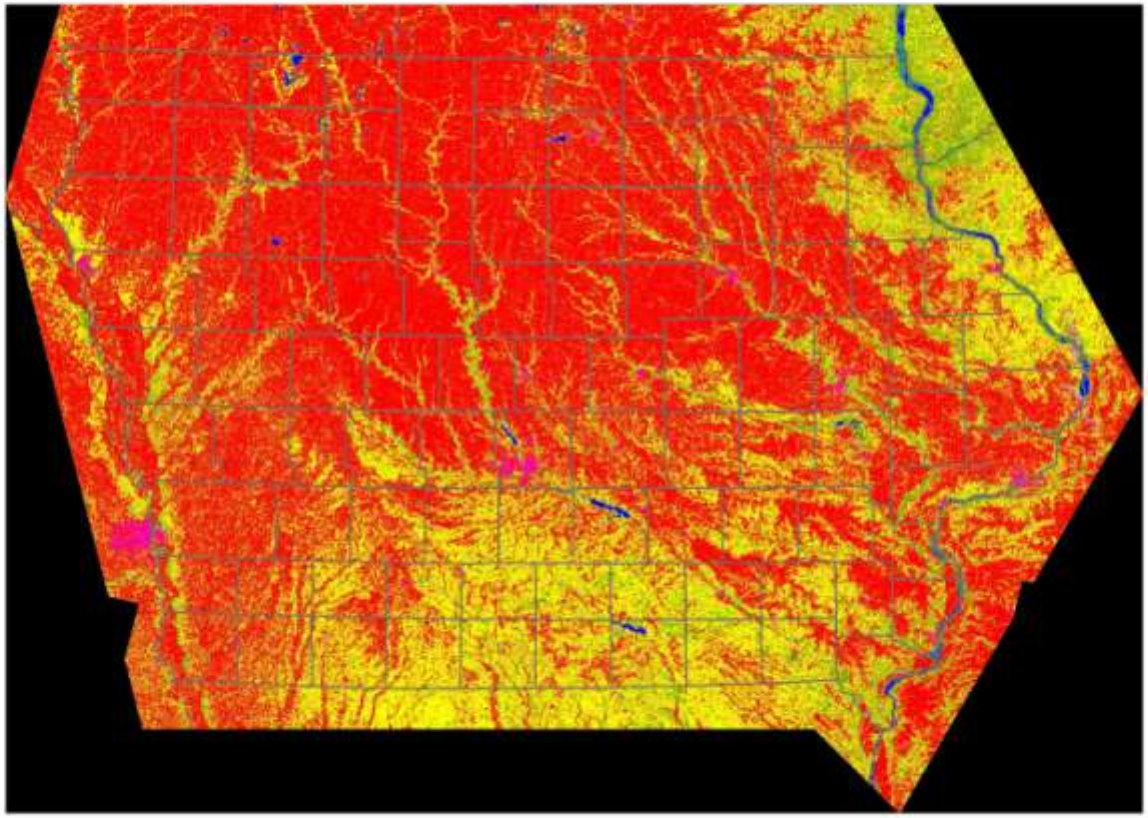
General Land Survey
1832-1859



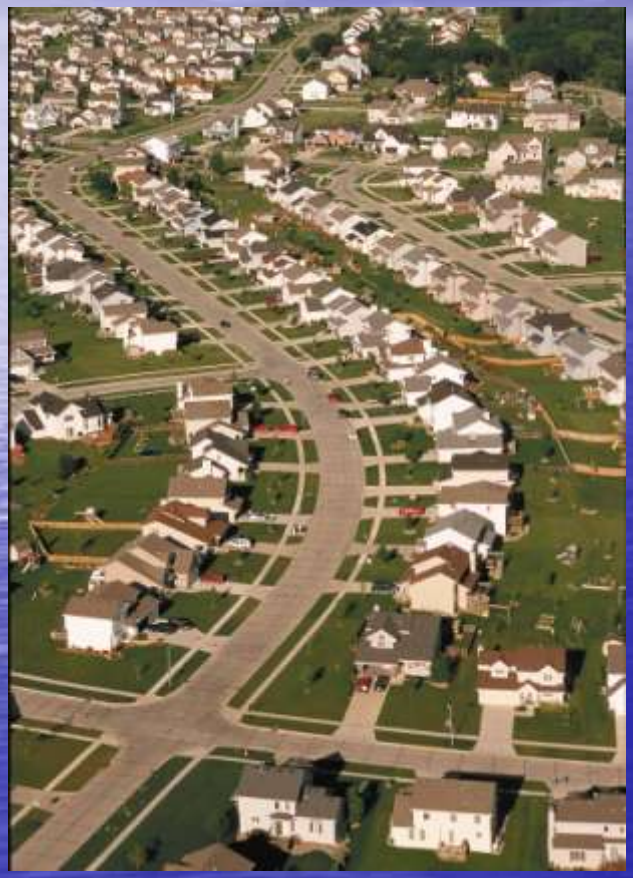
Iowa was a sea of prairie, wetlands, and meandering streams.

Iowa Settlement

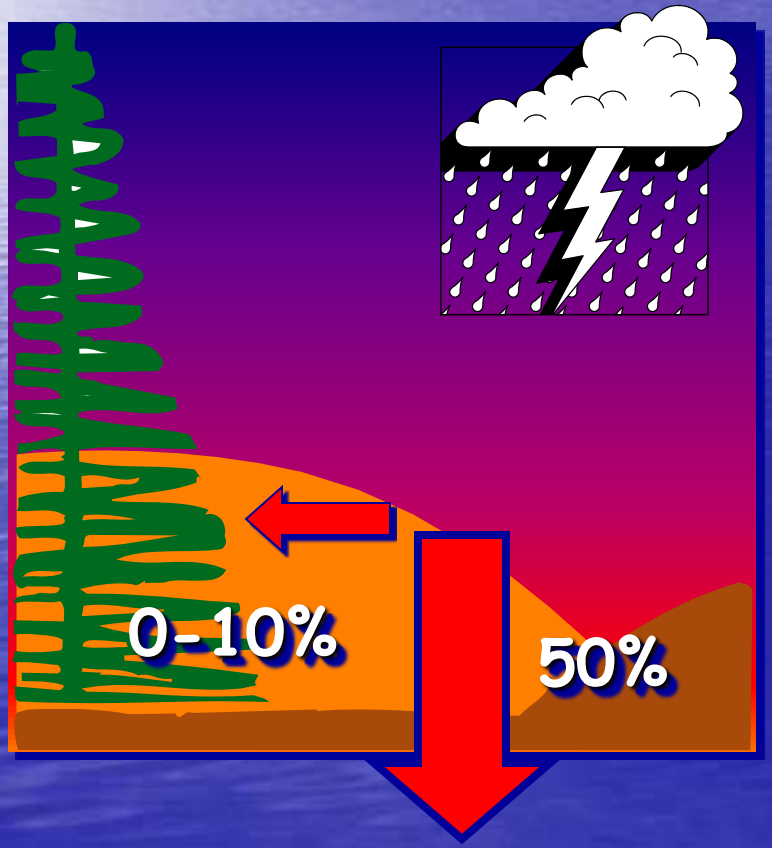
Iowa Land Use Cover 2002

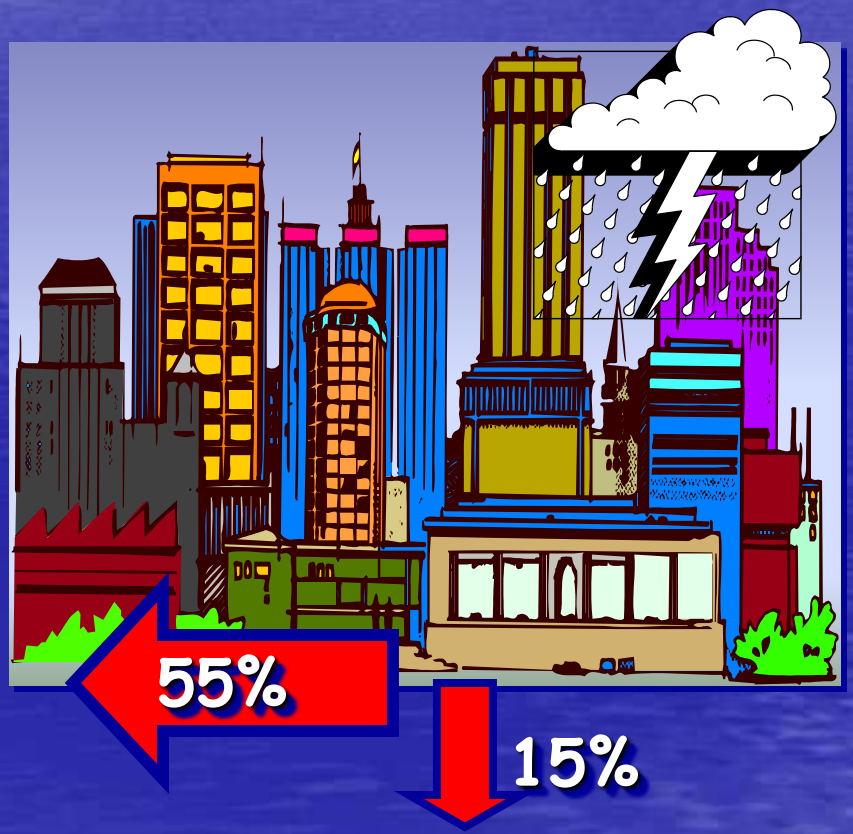


A Changed Landscape

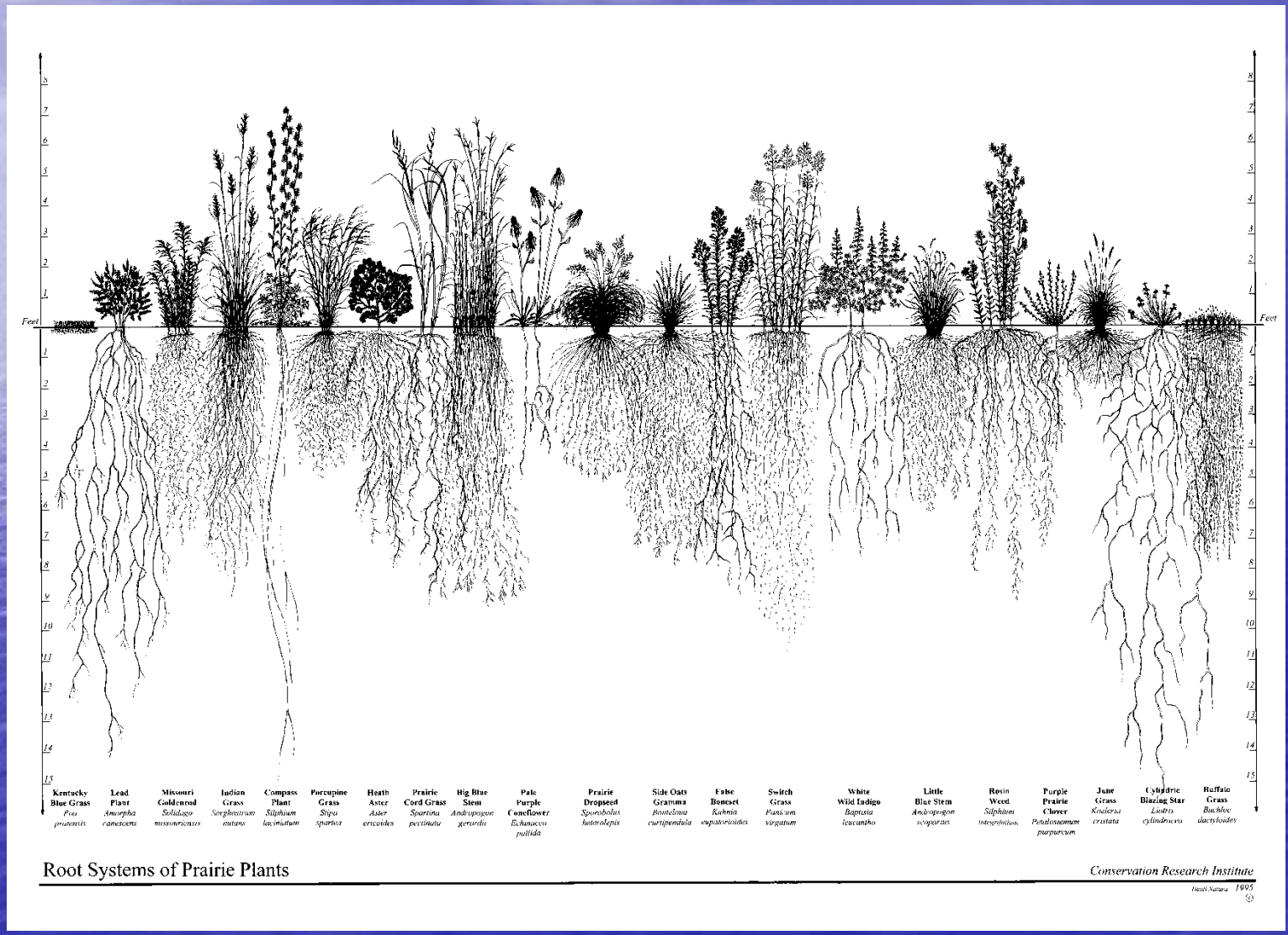


Historic Hydrology
vs.
Modern Hydrology





March Madness



Historic Landscapes

- Prairie soils had 8-10% organic matter content and 45% pore space
- Now soils have < 4% OM
- Even less organic matter on construction sites
- Soils have lost 60-80% of their ability to absorb and infiltrate rainfall events

What do a wetland and sponge have in common?

Straightened streams and developed floodplains

- Flashy streams
  (high/low flows)
- Deepening and widening of stream channels
- Vertical and bare banks
- No place for out of bank flows to infiltrate due to developed floodplains

Addition of Impervious Surfaces

Concrete, asphalt, roofing, and compacted soil prevent rainfall from infiltrating into the ground.

Stormwater Challenges

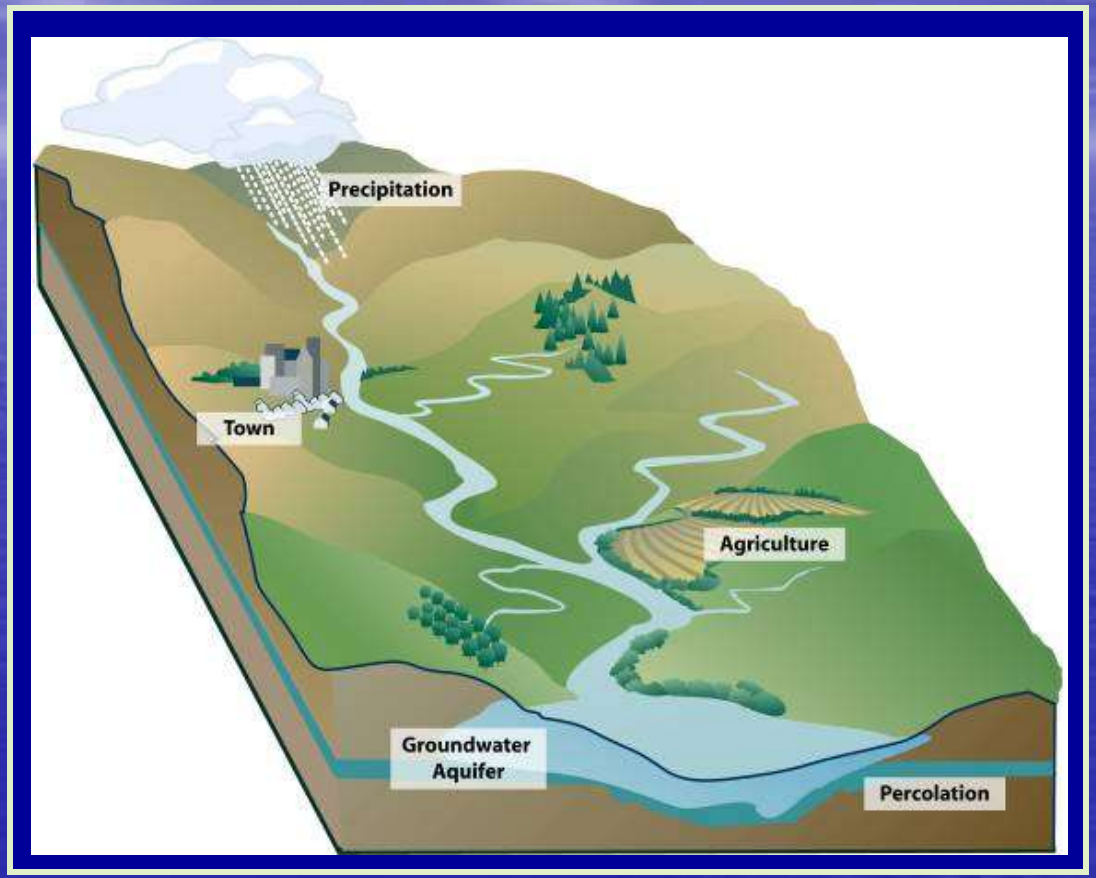
- Urbanization
  - Increased peak flows & total volume of stormwater runoff
  - Accelerated stream channel erosion
  - Reduced groundwater recharge & stream baseflow
  - Degraded water quality

You live on waterfront property!

- You have waterfront property if there are storm drain inlets in the street.
- Storm drains are connected to streams, ponds, and lakes.
- Water is not treated before it flows to the stream.

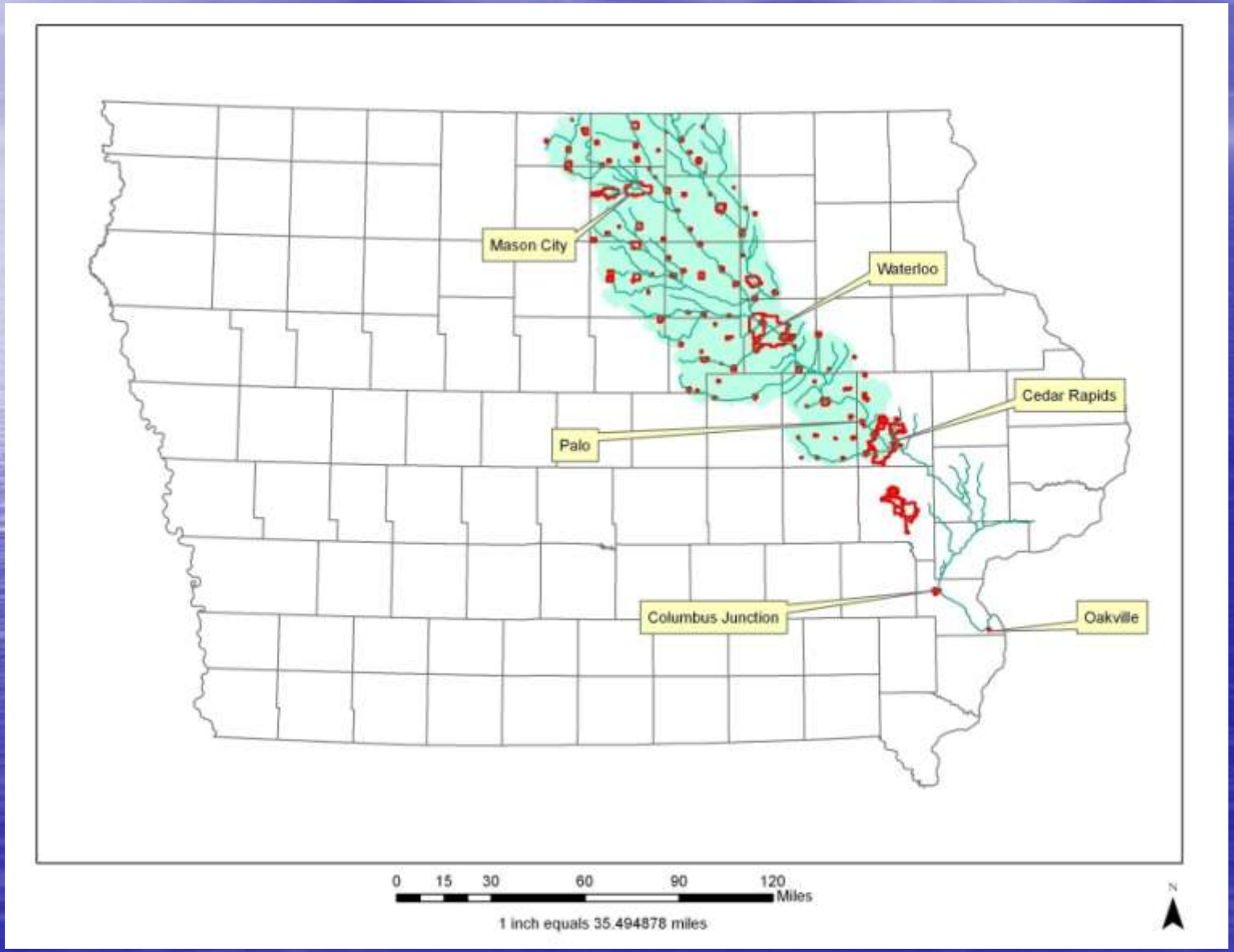
Storm Drain Inlet & Outlet in River

A watershed is a area of land where all the water drains into a particular water body

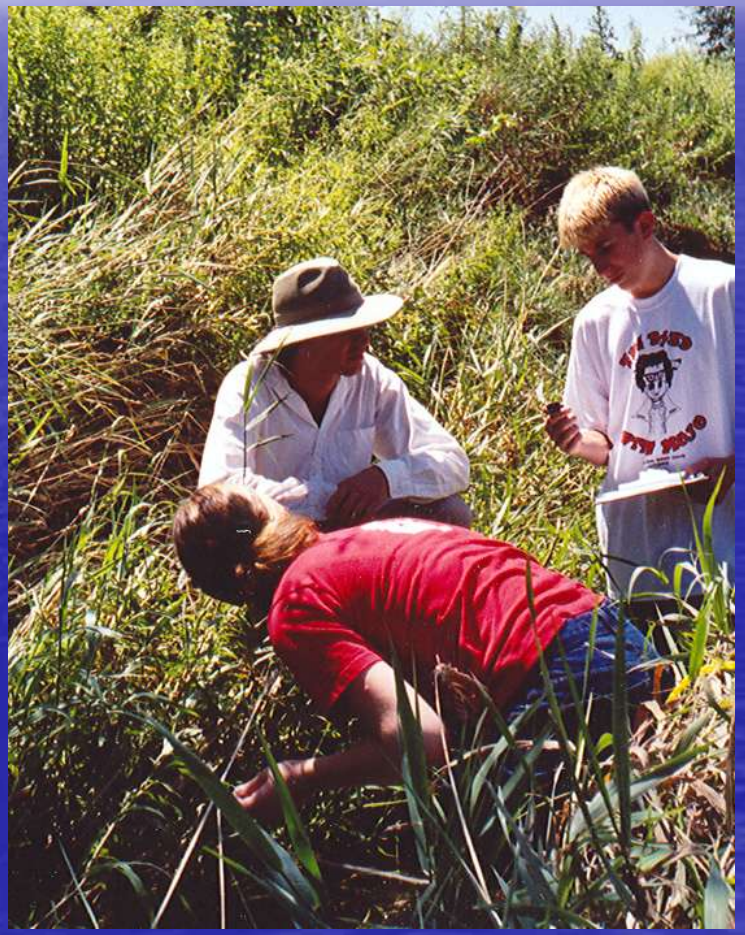


Drainage Area = ~5850 acres

Cedar River Watershed



Grassroots involvement:



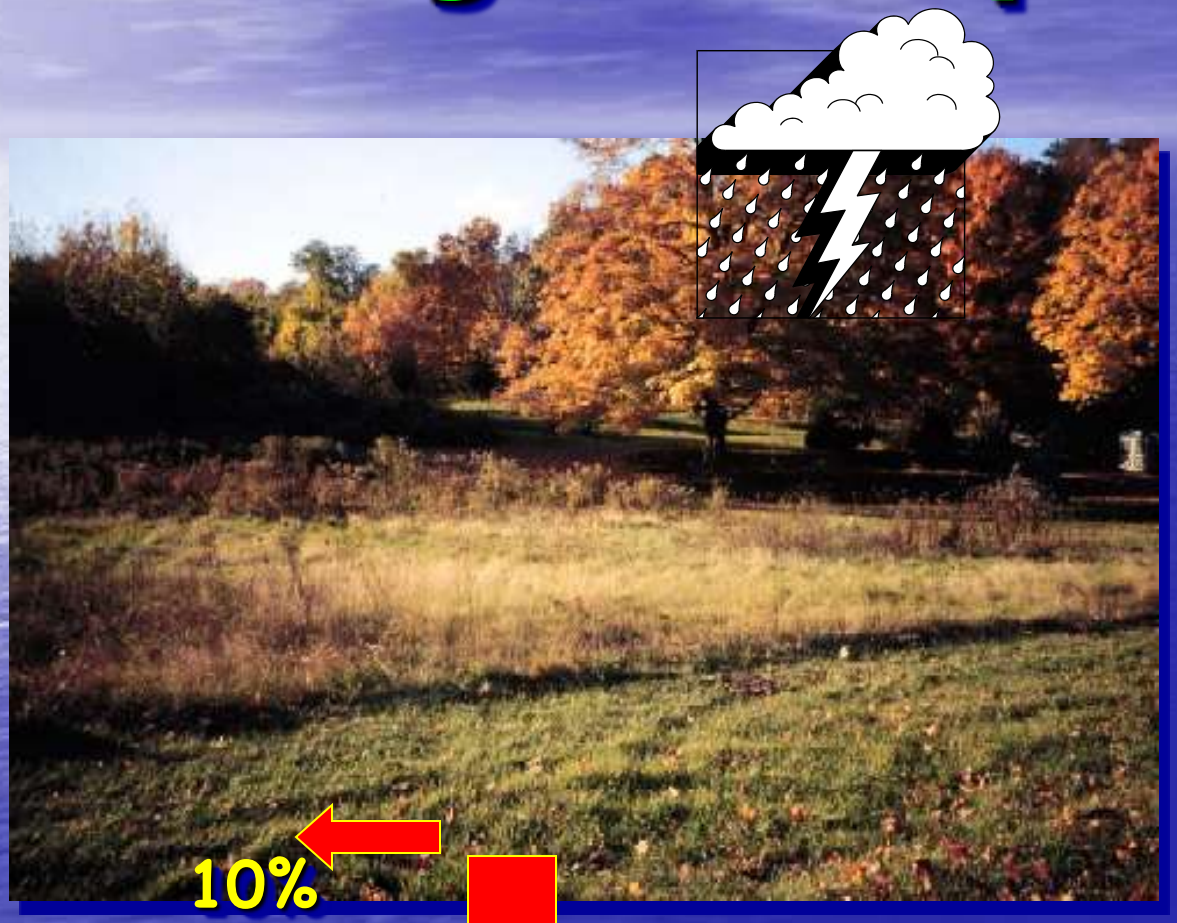
Watershed Planning Process

- Identify goals
- Inventory the watershed's existing conditions
- Assess/evaluate the information
- Develop watershed plan
- Write grants
- Implement plan
- Monitor the progress

Inventory the Watershed's Existing Conditions to identify priority areas

- Land use
- Tillage System
- Gullies
- Soils
- Topography
- Floodplains
- Existing infrastructure (roads, storm drains, impervious surfaces)
- Existing ordinances
- Natural Areas/Open Space/Riparian Corridors
- Plant/Animal Communities
- Water Quality and Quantity Data

Design Principles

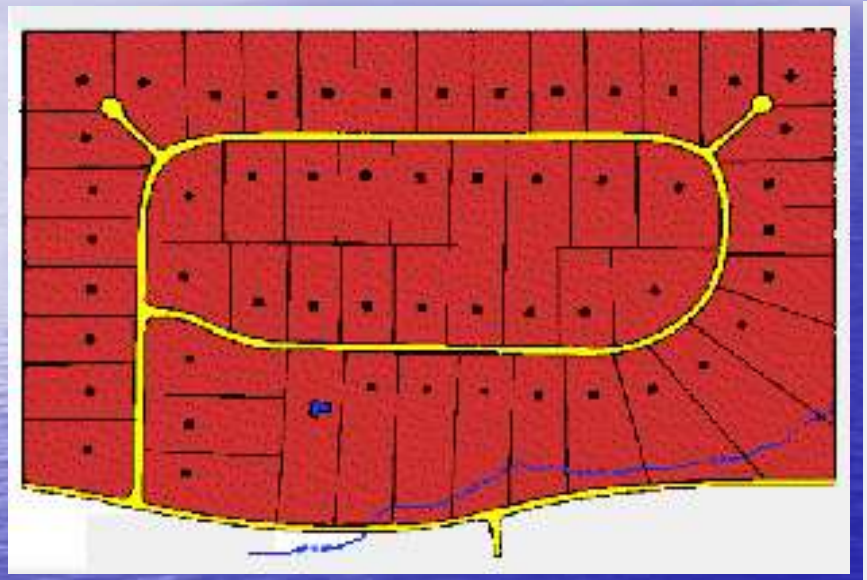


Retain rain on site.

Mimic the hydrology of the native ecosystems.

Infiltrate more. Shed less.

Open Space Developments



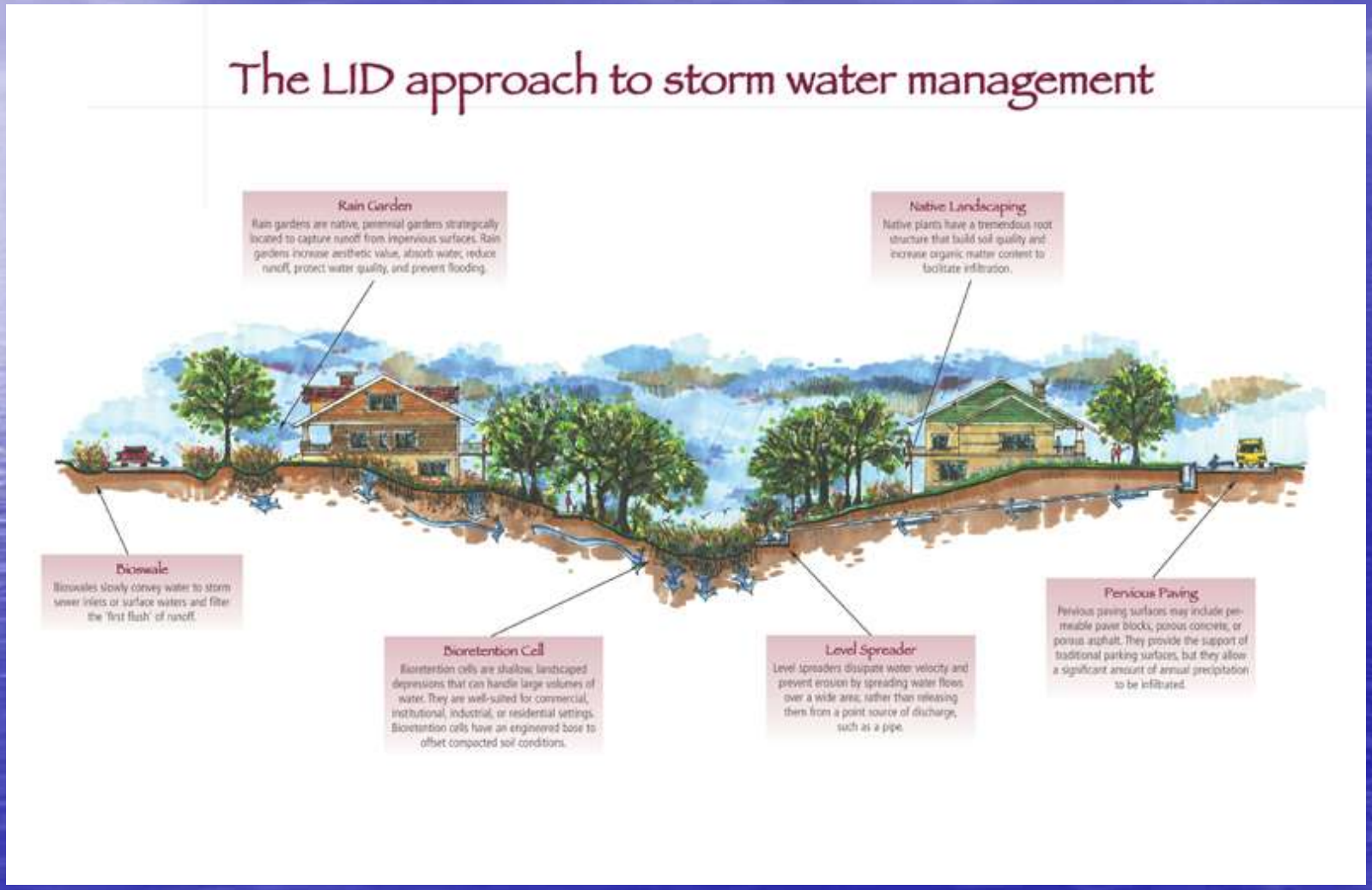
- same number of housing units
- 10-50% less impervious surface
- up to 50% open space
- water resources protected

From Randall Arendt

Green Infrastructure

Making Green Infrastructure an Amenity

Low Impact Development



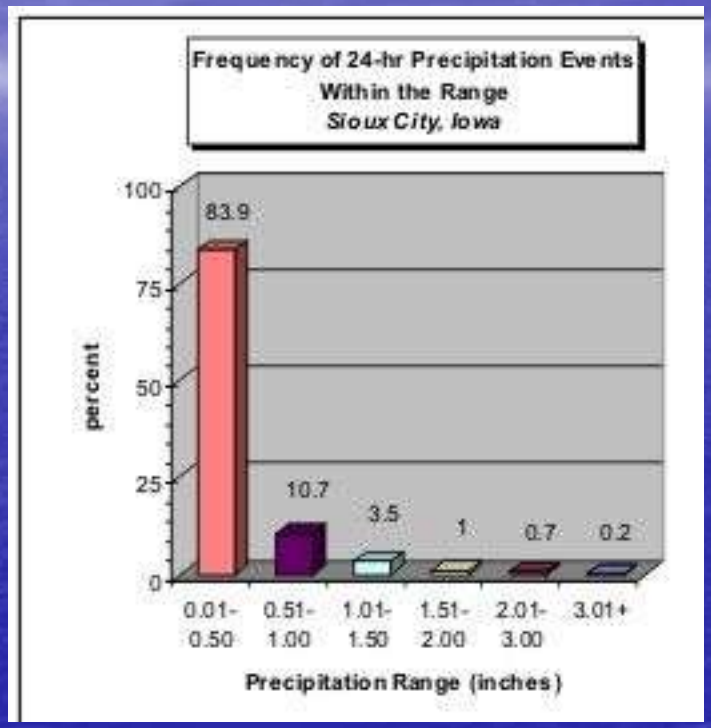
Managing Storm Water in 2010

- Infiltrate smaller rainfalls and retain larger events
- Different from traditional storm water design

One Problem: Conventional Site Design

Rainfall Patterns and Water Quality

- The 'first flush' of rainfall moves pollutant loads to surface waters
- Use practices that retain water from the small storms water on-site
- Strategies include:
  - soil quality enhancement
  - reducing soil compaction
  - vegetation selection



84% of storms <0.5 inch

94% of storms < 1 inch

How much rain water really flows off my yard?

- Average rainfall in Iowa: 28-36 inches per year
- Acre of land receives anywhere from 760,000 to 977,500 gallons of water per year
- 1/4 acre urban lot receives ~217,188 gallons per year
- To calculate the amount of water off your yard, contact at Rain Water Audit at www.jcswcd.org


A typical urban lot could shed 4,000 gallons of water into the street as stormwater runoff in a 1” rainfall event.
Rooftop & Patio- 900 gallons
Driveway- 500 gallons
Compacted Yard- 2,600 gallons
Yearly Stormwater Runoff- 128,000 gallons

Green Roofs

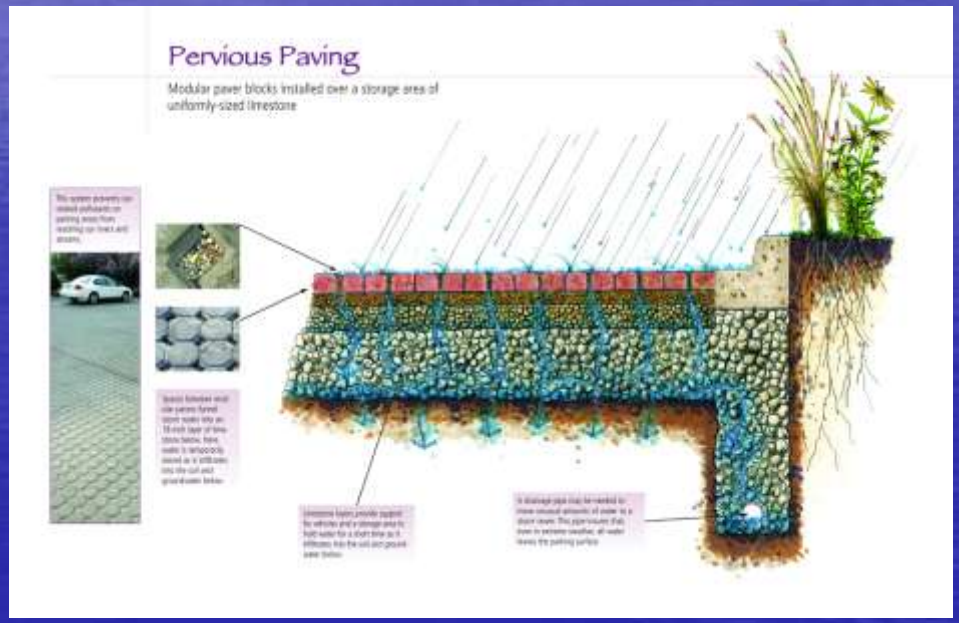
Collect rain water in a rain barrel

Rain Gardens

- A shallow depression to capture, temporarily pond, and absorbs run-off water from impervious surfaces (roofs, pavement)

Rain gardens slow down rainfall run-off on the way to surface water

Permeable Pavement



Native Landscaping

Soil Quality Restoration


Features
CLASS 'A' OFFICE

Existing Yards

Aerate soils prior to compost application

Turf grass after application of compost

Available Resources

- Iowa Stormwater Management Manual

http://www.ctre.iastate.edu/PUBS/stormwater/index.cfm

(Section 2E)

- Iowa Statewide Urban Design and Specifications

http://www.iowasudas.org/

- State funding and regional watershed coordinators
- Low Interest Loans

http://www.agriculture.state.ia.us/FieldServices/stormwaterBMPloans.asp

"The Department has years of experience working with farmers and believes this is just the beginning of efforts to assist urban areas. Urban Conservationists will help communities install new systems and retrofit existing infrastructure in a way that will move the water off our streets while keeping soil and pollutants out of our waterways. Our goal is to have urban and rural areas working together to protect our soil and improve water quality in the state."

Secretary of Agriculture Bill Northey

http://www.iowaagriculture.gov/FieldServices/urbanConservation.asp